Daniel Abraham

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Professional Experience

- **1994-Present.** Argonne National Laboratory
  - **2001-Present**. Materials Scientist and Team Leader, Advanced Battery Research for Transportation (ABRT) program
    - Leading the development of advanced diagnostic tools and techniques, which include diffraction, microscopy, spectroscopy and electrochemistry methodologies, that provide a fundamental understanding of materials and processes responsible for lithium battery performance
    - Identifying phenomenological mechanisms has enabled development of solutions to overcome performance limitations of battery systems
    - Directing and coordinating work being conducted at multiple institutions as part of the U.S. Department of Energy's Advanced Technology Development and ABRT programs
    - Investigating novel electrode and electrolyte materials for lithium battery and ultracapacitor applications
    - Exploring avenues for recycling existing lithium batteries to recover non-renewable inorganic components, and to develop sustainable battery chemistries containing renewable components derived from natural organic sources
  - **1994-2001**. As Materials Engineer and Team Leader in the Nuclear Technology program, planned, implemented and supervised the development, synthesis and characterization of corrosion-resistant alloys to contain radioactive isotopes isolated from spent nuclear fuel
- **1988-1993**. Research Assistant, University of Illinois at Urbana-Champaign. Designed and implemented experiments to study the mechanisms and hydrogen ingress and hydrogen embrittlement of stainless steels
- **1986-1988**. Research Assistant, University of Nevada-Reno. Designed and conducted experiments to study corrosion of container materials being considered for nuclear waste disposal
- **1985-1986**. Metallurgical Engineer, Larsen & Toubro, Ltd., Bombay, India. Responsible for the evaluation and testing of alloys being used in the manufacture of pressure vessels and boilers

Career Highlights

- Leading scientist in the field of lithium-ion batteries
- Lead the effort to identify performance degradation mechanisms in lithium-ion cells to enable development of alternative materials and components that enhance cell performance, calendar life and safety
- Safe storage of nuclear waste arising from efforts to recycle spent nuclear fuel

- Considerable expertise in the structural characterization and surface analysis of materials, alloy synthesis, microstructure examination and corrosion testing

Research Interests

- Discovery and development of electrode and electrolyte materials for sustainable and environmentally friendly batteries
- Recycling existing lithium-ion cells to recover non-renewable components

Awards

- Engineer of the Year Award, MEANA (2009)
- Pacesetter Award, Argonne National Laboratory (1999)

Professional Society Affiliations

- Member, Electrochemical Society
- Mentor and research guide of undergraduate students, graduate students and postdoctoral associates from the U.S., Sweden, Germany, Poland, Spain, Japan, India and China
- Past member of ASM International, NACE International and American Vacuum Society

Education

- PhD, Metallurgical Engineering, University of Illinois at Urbana-Champaign, 1993
- MS, Metallurgical Engineering, University of Nevada-Reno, 1988
- BTech, Metallurgical Engineering, Indian Institute of Technology, Bombay, India, 1985

Publications & Presentations

- 50+ publications in peer-reviewed journals
- 100+ publications in conference proceedings, extended abstracts and technical reports
- Key note and invited lectures at international conferences on battery materials and diagnostic techniques in the U.S., France, Singapore, Japan, Korea and China. Recent conference participation includes:
  - Lithium Batteries Discussion (LiBD 2009), Arcachon, France
  - International Conference on Materials for Advanced Technologies (ICMAT 2009), Singapore
  - International Lithium Battery Meeting (IMLB 2008), Tianjin, China
- Research presentations on nuclear waste treatment and disposal at several national and international conferences
- Research presentations at numerous program review meetings and technical society meetings such as
  - Electrochemical Society
  - American Vacuum Society
  - ASM International
  - NACE International